USAID Trade Project

FBR Business Intelligence Assessment

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Table of Acronyms & Initialisms

Acronym	Definition
BI	Business Intelligence
DBA	Data Base Administrators
DW	Data Warehouse
ETL	Extraction, Transformation, and Load
FBR	Federal Board of Revenue
FTP	File Transfer Protocol
GATT	General Agreement on Tariffs and Trade
NTC	National Tariff Commission
OLAP	Online Analytical Processing
PRAL	Pakistan Revenue Automation Ltd.
R&A	Reporting and Analytics
SME	Subject Matter Experts
SQL	Structured Query Language
SSIS	Sequel Server Integration Service
USAID	US Agency for International Development
USD	US Dollar
WCO	World Customs Organization
WeBOC	Web Based One Customs
WTO	World Trade Organization
XML	Extensible Markup Language

1. Executive Summary

This report provides an overview of the business intelligence (BI) efforts currently undertaken by the Federal Board of Revenue (FBR). The focus of the report is on Customs and Valuation Directorates and their use of valuation data to address valuation questions and decisions.

The Trade Project conducted investigations to assess the current state of the BI initiatives at the FBR. Although little tangible information was provided, discussions with the Web Based One Customs (WeBOC) department of Pakistan Customs and Pakistan Revenue Automation Ltd. (PRAL) established that the business intelligence effort is in its infancy. The structure and processes are still being developed and no tangible content, in the form of reports, dashboards, or Online Analytical Processing (OLAP) cubes, is available for use.

The recommendations contained in this report provide suggestions for the establishment of a standard BI initiative with established processes and components. In addition to the guidance provided regarding BI and data warehousing components and processes, recommendations are also presented on what platforms and software are suitable to utilize. It is suggested that the FBR should use its existing Structured Query Language (SQL) capabilities and experience to operate an SQL server and its complementary components for the establishment of a BI environment. This should make for a lower barrier to entry for FBR to expand the information management initiatives to include the development of a data warehouse and its related products.

Multiple challenges to implementing a BI strategy were identified during the research and development of this assessment. These challenges included:

- Frequent changes in FBR leadership
- Lack of business plan continuity
- Inadequate institutional controls and standards
- Lack of dedicated funding
- Directorates operating independently

These institutional challenges will be important considerations to take into account in addition to the expected challenges of developing an effective data warehouse.

2. Introduction

2.1 Purpose

This report is a review of the FBR's current BI effort, and includes recommendations for improvements to meet their information, reporting, and analytical needs. The focus of this effort centers on the collection and use of valuation data by Customs. This report may be beneficial to any future group that is asked to assist FBR with their BI initiatives, but the primary audience, and ultimate beneficiaries of this report, are the FBR and its subordinate Directorates.

2.2 Background

Late in 2012, FBR requested assistance from the Trade Project to strengthen their valuation database. The Trade Project proposed to support FBR by assessing the functional capabilities and examining the alignment of the valuation database, and its use, with business requirements. Once completed, the Trade Project could then explore recommendations for a software development strategy to bring the valuation database up to par with the FBR's needs.

After extensive discussions between the FBR and the Trade Project, this request evolved into a review of FBR's data management and analysis capabilities in support of its Compliance and Risk Management (CRM) functions. Key tasks associated with the review, and applicable to this report, were as follows:

1. Identify external electronic business information intelligence sources
2. Review the current reporting capabilities of the Data Warehouse (DW)
3. Identify flaws and vulnerabilities in the data analysis
4. Develop a roadmap to rectify the data analysis and reporting capabilities

Associated with these tasks was the creation of a report that would describe FBR and PRAL's current data warehousing effort, the data Extraction, Transformation, and Load (ETL) methodology, reports and reporting capabilities, and any data analysis being performed. The report would also contain recommendations for improving the data warehouse, reporting capabilities, the use of BI Dashboards and BI tools, and an implementation roadmap.

All of these efforts were to be completed with the cooperation of the FBR.

2.3 Scope

Topics in data warehousing and business intelligence are extensive and varied across the vast array of subjects and disciplines that compose these fields. This report is restricted to the following subjects:

- Business Intelligence Architecture
- Data Warehousing Roles and Responsibilities
- Data Warehousing Development Methodology
- Data Warehousing Components

In addition to these topics, this report will also focus only on the collection and use of valuation-specific data. No pricing data was considered during this evaluation. Valuation data was identified by FBR as the primary area where guidance and assistance was needed in order to improve Customs operations. Valuation data, in this instance, encompasses the data that is used to assess the value of goods being imported into Pakistan and related data. This includes transactional data associated with imports, as well as external valuation sources used by the Valuation department of Customs for investigative purposes.

2.4 Assumptions

This report was developed for reference and use by qualified IT professionals. Not all technology and information-related subject matter will be presented at an introductory level; familiarity with basic IT operations and practices is assumed.

3. Current State of FBR's Business Intelligence

In evaluating the current state of Customs' BI initiative, several areas were examined: source data, ETL processes, data warehouse structure, analytics, and reporting. Although all four categories were pursued, the amount of information provided varied across categories. The following provides some insights into the current state of the BI initiative in Customs.

3.1 Source Data

For any Customs BI initiative, data will need to be procured from various sources. To assess the current data sources, the following were considered most relevant to the initiative:

- Valuation Rulings – Data composed of various rulings that directly affect imported goods and the values assigned to those goods. Data will be essential to determine if imported goods are being assessed according to acceptable values and to identify any gaps in collection that may exist.
- External Valuation Data – Data identified by Customs as essential to assess a reasonable market value for imported goods. Data would comprise market values for goods by country of origin, product and product category, quantities, and prices. Data would be retained indefinitely in order to have historical information and trends available for future inquiries.
- Internal Valuation Data – Data collected for imported goods and captured in WeBOC, and similar applications that capture import data. Data would comprise information such as date of import, location, importer, exporter, manufacturer, assessor, quantity, declared amount, assigned amount, duties collected, and any other pertinent data. Data would be captured and retained indefinitely so that assessors can review the legally authorized 90 days of historical data, investigative units can assess past data, and Customs can perform analytical research on the data collected.
- Customs Tariff Data – Complete list of tariff codes with associated descriptions and the category's descriptive characteristic.

From the aforementioned categories of source data, internal valuation data is most critical to a Customs BI initiative. This information will be critical to assessing the goods being brought into the country, points of origin, duties collected, problems, opportunities, and trends. Attempts have been made to review this information and include it in the assessment; however, the FBR did not approve the sharing of relevant table structures and sample data.

For internal data, there are some concerns regarding which system(s) to utilize with the quality of data available. Customs is in the process of migrating various legacy systems (One Customs, Border Valuation, and manual processes) to a single web based one customs system (WeBOC). Progress is ongoing, however, there are conflicting reports on the completion date and the degree to which the legacy systems have been migrated, in functionality and use, to WeBOC.

For the three remaining categories of source data, information has been provided, albeit at varying levels. Information regarding the remaining three categories is described in the following sections.

3.2 Source Data - Valuation Rulings

The Valuation Directorate issues rulings as a result of investigations conducted by their department. These rulings affect the price for goods being imported into the country. Information about the rulings is captured electronically and stored in approximately twelve tables (listed in **Appendix B**). These tables have been reviewed, and are not in compliance with generally accepted international database standards. The tables developed by the Valuation department of Pakistan Customs are not normalized and lack referential integrity. Data pulled from these tables will require a thorough review to determine if it will require cleansing before being used in a data warehouse.

3.3 Source Data – External Valuation Data

External valuation data is used by the Valuation Directorate to analyze data pertinent to investigations, and by assessors to assess the value of goods being imported into the country. It has been stated by Valuation that a more comprehensive external valuation dataset is needed for future analysis and assessments.

According to Valuation, there are only five external sources that are currently being utilized, which are delivered in hard copy and are as follows: Chemical prices, Metal Bulletin describing current prices for various metals, Platts Polymerscan for various petroleum and petroleum-related products, the Public Ledger's Market Prices for a wide variety of products and product categories, and the Pakistan Tea Association's market prices for teas. It was stated that these five sources cost the Valuation department USD 20,000 annually. With the five external sources representing a significant portion of the Valuation Directorate's budget, it was stated that there is little room in the budget for additional sources of data. If additional sources of data are to be added to their inventory of sources, they will need to be subsidized or provided at a very low cost.

Additionally, it was stated by the Director of Valuation that there were certain industries and groups that were of little or no concern with regard to being regulated, or the risk was so low that under invoicing could occur. Such groups include multinational corporations, government entities, and large manufacturing companies. Also, exports represent a very small percentage of Customs' related activities and therefore should not be a focus for inclusion in BI efforts at this time.

3.4 Source Data – Customs Tariff Data

Customs tariff data is the glue that joins internal, external, or any other valuation data. Customs tariff data details the various product categories for Pakistani imports and exports. Product analysis originates against the various import and export product categories. There are four levels of product categories that exist; Pakistan's import and export products should be associated with the lowest level.

The basic structure of this data has been provided by PRAL, although information on characteristics that describe the data at various levels is lacking. If the information is available, it should be included in the dataset.

3.5 Data Warehouse Design and Development

Based on discussions with representatives from WeBOC and Customs, Customs data warehousing is currently in development. On August 29, 2013, the Trade Project was informed that there were 15 to 18 dimensions, and 4 to 5 fact tables. No information was shared about the content of the dimensions or fact tables.

The Trade Project received limited information on the effort, despite repeated inquiries. What is known is that SQL Server is being used as the data warehouse platform and SQL queries have been created to populate the dimension and fact tables. What is not known is the frequency of the updates, whether or not a staging area is being utilized, the quality of the source data, any cleansing or transformation of the source data before it is added to the data warehouse, the use of data warehouse's data, whether or not the data warehouse is being supplemented, or updated, with new data or if the data warehouse is being truncated and repopulated, the availability of the data warehouse, the benefits realized by the data warehouse, or whether the data warehouse meets current or long-term information and reporting objectives.

3.6 Extract, Transform and Load (ETL)

ETL refers to the process of identifying and extracting source data, transforming that data into acceptable predefined formats so that the information from disparate systems can exist transparently

and cohesively in a single environment, and the loading of that data into the data warehouse for use. This is a standard process for BI initiatives around the world and the identification of proper data sources and the standardization of that data for the data warehouse is of utmost importance. A review of the Customs' ETL processes was not made available to the Trade Project but some information was gleaned from interviews.

For external valuation information, there are no transformations being made on any of the information received. The information is received in a non-electronic format in the form of charts, graphs, and tables, and the pages of information are scanned into PDFs. The PDF images are then uploaded onto the Pakistan Customs Valuation Gateway for use (see **Appendix C** for samples of external valuation sources).

With the limited information available on ETL processes of the data warehousing effort, the Trade Project can only confirm that SQL queries are being used to populate the Customs' data warehouse currently in development.

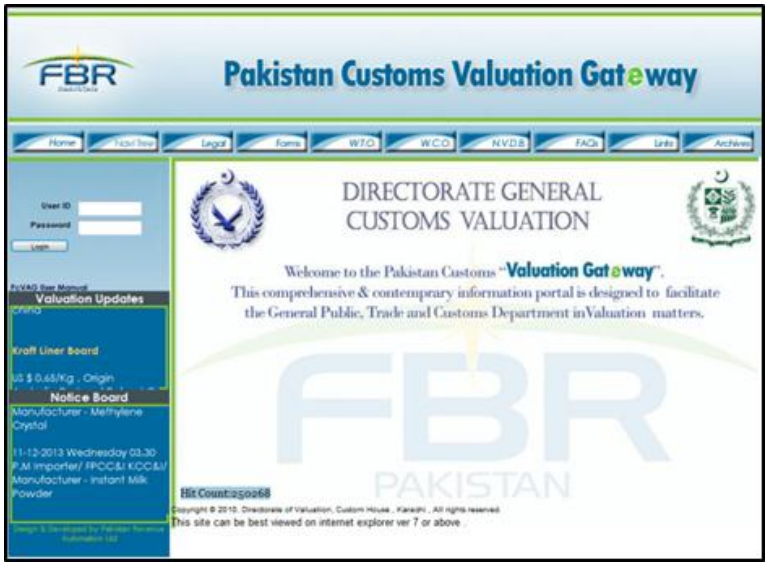


Figure 1: Pakistan Customs Valuation Gateway

3.7 Analysis/Reporting

Regarding front-end analytical tools, it was stated that no analytical tools are currently being utilized to review the warehouse's data. Due to the costs and difficulties in distributing and maintaining the client-based analytical applications, it was suggested that a web-based reporting and analytical system may be beneficial to Customs. To leverage WeBOC and maintain a cohesive web presence, a web-based analytical tool that could integrate, or at least appear to integrate, with WeBOC, would be ideal.

Reports containing valuation data and used by the Valuation department can be found in WeBOC; however, it has been stated these reports are static and do not allow for any significant investigative analysis. Descriptions and samples of these reports were requested from WeBOC and Valuation, but were not provided to the Trade Project.

Based on the information provided, it is difficult to make an accurate assessment of the current state of Customs' BI effort. What is known is that a data warehousing effort has been initiated.

4. Business Intelligence Architecture

It is recommended that the FBR employ a traditional BI implementation that has clearly defined activities and products. The following is an illustration of the BI architecture:

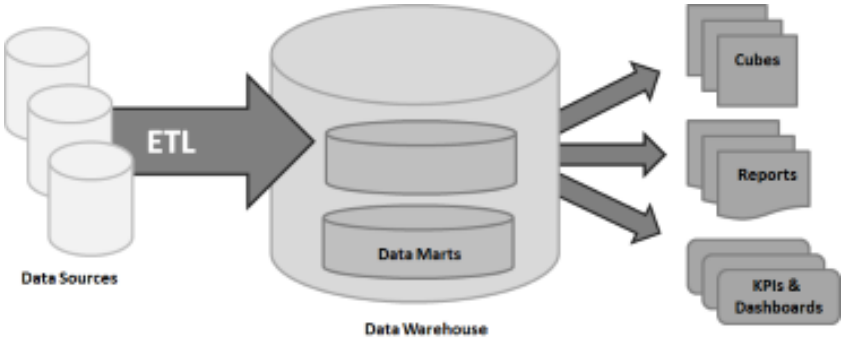


Figure 2: Business Intelligence Architecture

The following sections describe the components of the BI architecture.

4.1 The Data Warehouse (DW)

The Valuation DW will be central to the BI effort. The DW should be developed to house all the transactional import data, external valuation data, and any additional data to support these two primary data sets. The Valuation DW will likely be composed of two data marts: Internal Valuation Data Mart and Ruling and External Valuation Data Mart. For reporting and analytic activities, the OLAP cubes should be developed containing data present in the two data marts.

The Internal Valuation Data Mart

The primary purpose of the Internal Valuation Data Mart is to retain the data collected from the import process. This data mart would house all of the relevant import data captured in WeBOC, coupled with valuation rulings, and customs tariff codes. Valuation, and other FBR Directorates could also be involved with investigating the data captured and stored in this data mart.

Since the structure of import data present in WeBOC was not provided, it is not possible to accurately identify the dimensions and fact tables that could compose this data mart. Based on the limited information provided by the FBR, external sources, and the Trade Project's knowledge of Customs, following is a list of dimensions that should be considered for the data mart:

- Product – Captures product-specific information such as name, description, type, unit of measure, lowest level Customs Tariff category, and other relevant product characteristics.
- Manufacturer – Names of manufacturers and relevant information.
- Importer – Names of importers and relevant information.
- Exporter – Names of exporters and relevant information.
- Location – Import locations such as Karachi/Lahore, locations where goods are manufactured, export locations, and locations of the various entities captured in the data warehouse. To differentiate the various types of locations, a location type is suggested. This dimension would house information such as location name, region or state, country, and any other information about the location deemed relevant.
- Employee – Names of employees in the FBR and potentially the entire Government of Pakistan (GoP). This information would be needed to associate imports, investigations, and various other Customs activities such as assessments of individuals and organizations.
- Organization – Organizations present in the FBR and potentially the entire GoP. This data may be multi-layered so as to represent the various subordinate organizations present in Directorates and similar organizations.

- Valuation Rulings – List of rulings affecting goods being imported.

The primary fact table associated with this dimension would initially be associated with the imports entering Pakistan. More specifically, the Imports fact table would capture information at the time of the import. Fact tables would reference identification keys present in the product, manufacturer, importer, exporter, location, valuation rulings (if applicable), and employee dimensions and relevant facts associated with the act of importing goods into the country. Some of the facts that should be retained in this table include the date of the import, the date the goods arrived at the port, quantity, declared price, assessed price, and additional information associated with the assessment of goods' valuation and declarations.

The External Valuation Data Mart

The purpose of the External Valuation Data Mart is to store the external data collected from the various data sources utilized. The information contained in the data mart would be product-focused, with many of the same attributes of the Internal Valuation Data Mart but with a few differences. Information in this data mart would represent the prices collected from around the world covering the entire spectrum of products that Pakistan imports. The volume of information contained within this data mart has the potential to grow at a much, much faster rate due to the numerous data sources that exist and the nearly 200 countries that could have data to contribute to the data mart. Careful consideration should be given to the sources of data utilized as there could be duplication of data if data sources are providing information about the same transactions.

Both of these data marts will be useful for trending other analyses about the products captured. The analyses would indicate how product prices and quantities change and identify importing entities, importing destinations, and the quantity of imports coming into the country. The analyses will also be able to identify dubious importers, exporters, locations, and products. Perhaps the biggest benefit to be realized would be the convergence of the information in both data marts. This convergence could provide new, nearly real-time insights into regional and international pricing and the pricing being declared for goods entering the country. This information may not necessarily be utilized or referenced by assessors at the "docks" but could be used by investigators and managers to identify problems and pay close attention to dubious locations, products, and importers.

4.2 ETL

ETL covers all aspects of the movement and manipulation of data from the source systems to the destination databases and its tables in the data warehouse environment. To make data available for use in a data warehouse, the data must go through a multi-step cleansing and preparation process. A formalized ETL system is necessary to create structured, uniformed, and repeatable processes to extract data from source systems, remedy data anomalies, manipulate data to create consistent and reliable data, and populate the destination tables in the data warehouse.

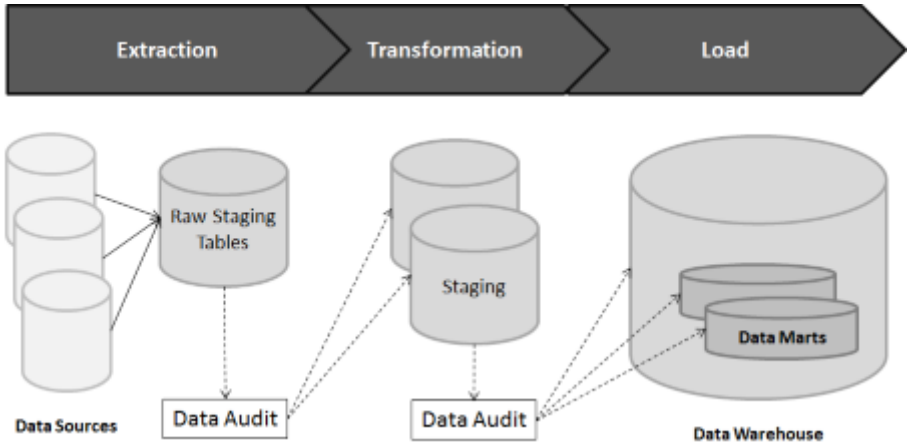


Figure 3: ETL Overview

Extraction

The extraction phase focuses on the retrieval of information from source systems. This could be a push or pull process to obtain the desired data. Determining what information to extract will require support and assistance from technical and functional leads familiar with the system(s) that the data originates from.

The most common data extraction formats are text files (delimited or fixed length), direct queries from the ETL environment to the source databases, or data in an Extensible Markup Language (XML) file.

Transformation

The transformation phase is where the rules and logic are applied to the raw data realized in the extraction phase to produce desired data sets for eventual upload into the data warehouse and its data marts. Some data sets may require little or no manipulation at all; whereas others may require extensive cleansing, manipulation, or merging with other data sets to produce the desired information for the data warehouse.

In this phase data is cleansed of anomalies, formatted, and checked to ensure that the data meets the needs of the destination data marts and tables in the data warehouse. Examples of the types of activities that take place in this phase are as follows:

- Standardization – If data arrives in multiple formats or as multiple values representing the same or similar values, then standardization of the data may be required to convert the disparate data into the same or similar values.
- Conversions – This would include changes to the data based on the source value not being in a desired format for the data warehouse. For example, the conversion of 1 or 0 to a Yes or No or the conversion of a location from ISL to Islamabad may need to be performed.
- Calculations – Could represent simple transaction as qty * price = total sale price or a complex algorithm based on many data points.
- Joining – Represents merging or joining of tables to produce a new value or data set.
- Sorting – Ordering the data in a particular order.
- Aggregations – Summing the values across multiple records to achieve a total, average, or other related aggregation for a parent unit or group.
- Transposition – turning multiple columns into rows and vice versa.

Load

This phase loads the data into the data warehouse. Some data warehouses may overwrite existing information with cumulative information; updating extracted data is done on a daily, weekly, or

monthly basis. Other data warehouses (or even other parts of the same data warehouse) may add new data in a historical form at regular intervals (e.g., hourly); for example, a data warehouse that is required to maintain import records of the last year. This data warehouse overwrites any data older than a year with newer data; however, the entry of data for any one-year window is made in a historical manner. The timing and scope to replace or append are strategic design choices dependent on the time available and the business needs. More complex systems can maintain a history and audit trail of all changes to the data loaded in the data warehouse.

ETL for External Valuation Sources

As stated in the Current State of FBR's BI section, external valuation sources are being used by the FBR and Valuation to identify values to assign to products associated with investigations. The information is currently received as physical documents and scanned into PDF documents for upload onto the website. The website is accessible by the appropriate Customs and Valuation staff members. None of the information is captured and retained electronically in a specific type of data repository. As a result, there is no current or historical information available for inclusion in a data warehouse.

Capturing this information and making it available for use in the data warehouse, and possibly to support the analysis of prices associated with goods being imported, was identified as a priority by many of the FBR's Directorates. To remedy this, a new approach and process will need to be employed to capture and retain this information.

The current method of receiving documents for scanning will need to be replaced by one that eliminates hard copies of reports and utilizes electronic versions of that information. For example, the Valuation Directorate utilizes Platts Polymerscan for weekly oil and oil market prices. This should be eliminated and replaced with an electronic data set that can be imported into the data warehouse. A review of the Platts website (platts.com) reveals that information is available on a daily basis and can be provided in .txt or .csv formats. Either format would be acceptable and would allow for meaningful and timely data to be imported into the data warehouse.

There are many ways to capture and load this information into the data warehouse. One option is to create a file transfer protocol (FTP) site where vendors such as Platts can upload the .csv files when they are ready for distribution. In SQL Server, or ETL environment if ETL software is purchased for use, a Sequel Server Integration Service (SSIS) package can be created to check if the desired file(s) exist and, if it is present, extract that file's content and load into the appropriate staging database's table(s). A job would also need to be created to run at specific times to launch the SSIS package. Additional steps would be needed to validate that the contents were extracted successfully and to move the file from the FTP site to a historical file folder. The following illustration shows how the process would work:

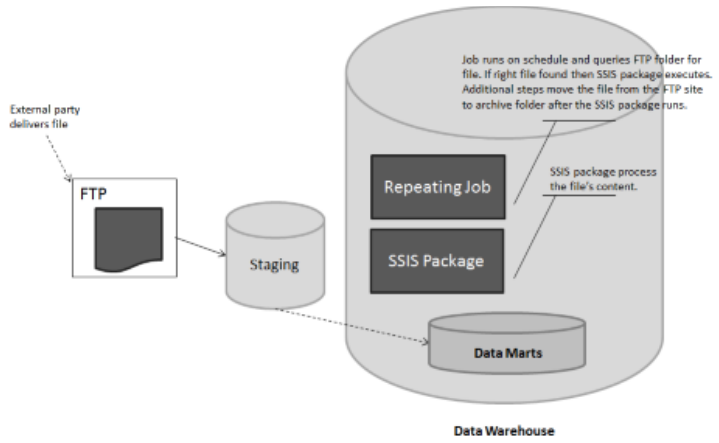


Figure 4: ETL for External Data Sources

By making these changes, the data would be available faster. Historical data would be available immediately for analysis, trending, and comparison to prices of goods being imported.

Data Quality and Governance

Conversations with Customs, Valuation, WeBOC, and PRAL identified data quality as a leading concern. The Trade Project's limited access to the database and table structure did bring to light that within the database structures, third normal form (third normal form is the third step in normalizing a database design to reduce the duplication of data and ensure referential integrity by ensuring that the entity is in second normal form and all the attributes in a table are dependent on the primary key and only the primary key) was not present, referential integrity not enforced, free form fields in tables with misspellings and inconsistent representation of data, and data types not appropriate for the data contained therein. These issues in the source systems will cause tremendous problems with the data integrity of a data warehouse, if not addressed. The ideal solution is the correction of data issues in the source systems, but if that is not feasible due to time, resources, or costs, then the issue will need to be addressed after the data is extracted from the source system and moved to the staging tables during the ETL processing. Although not the ideal situation, it could ensure the quality of data in the data warehouse, if addressed and resolved. If not, the users will not trust the information contained in the data warehouse and the project will either lead users astray with invalid and incorrect information being used as the basis for their decision making or the data warehousing project will end in failure.

Addressing data quality is a difficult task. Data needs to be reviewed for consistency, completeness, reliability, objectivity, relevance, and timeliness. There may be multiple steps necessary to create automated scripts and clean the data, but are considered essential to the process.

Addressing data quality and maintaining data standards for the data warehouse is one of the disciplines of a data governance program. It is recommended that a data governance program be created, not only to ensure that data quality is addressed, but also to ensure a consistent and standardized method for the handling of data across the data warehouse.

It is suggested that data governance should apply throughout the organization's information technology groups. Many of these groups operate independently, and therefore, the implementation of an FBR-wide solution may be difficult. The effort may be focused exclusively on the data warehouse environment. If not implemented across the entire organization, it is hoped that a groundswell will result in the data governance practices being adopted and implemented over time by other Directorates and IT groups.

Data governance exists primarily to increase consistency and confidence in decision making. Additional benefits to be realized include:

- Identifying individuals for information quality
- Improving data security
- Optimizing staff effectiveness by reducing or eliminating the need to address data quality issues after the data is populated into the data warehouse

If and when implemented, a data governance policy needs to be flexible enough to grow in the data warehouse and stringent enough to ensure that data quality and standards are maintained and enforced. The individuals in charge should also be held accountable for failures due to negligence. Ensuring that the data meets the highest standards and is reliable should be a high priority for the data warehouse administrator, executive sponsors, and leaders.

4.3 Environment

To build a BI solution that can meet the immediate and long-term requirements of the FBR, a well thought-out and planned BI environment will need to be established. The BI solution will need to be more than just a database and a repository for user reports. In order to support the long-term needs of the users effectively, and address potential financial limitations, the following is recommended:

Database Platform: SQL Server

Considering FBR currently uses the SQL Server as its database platform, there would not be any additional costs associated with purchasing an alternative platform or hiring relevant operational staff. However, with SQL Server retained as the database platform, there may be supplementary costs, such as annual license fees, upgrade fees, and the purchase of software to extend the database.

ETL: Native SQL Server Services

SQL Server can be leveraged to meet all of the ETL processing requirements with the available SQL Server Integration Services (SSIS), and may be most suitable for FBR's current BI capability and budget capacity. An upgrade in products and services could be considered in the future if so required to meet ETL requirements.

Establishing and standardizing ETL processes and administering ETL components may require more upfront work compared to out-of-the box ETL products. However, the FBR can utilize the experience of its SQL Server Data Base Administrators (DBAs) and savings from doing so could be appropriated for data warehousing efforts, staffing, maintenance, and presentation platform.

Software packages to manage the ETL process could be purchased from vendors such as Informatica and Business Objects. Purchase of this software should be considered before a decision is made regarding which ETL software to employ.

Presentation Platform: SQL Server-Related Products (Analysis Services)

Every effort should be made to ensure the data warehouse is stored and maintained on a reliable, up-to-date, and well-maintained server and network. The capability of the data warehouse to perform time and resource intensive processes during non-business hours, along with serving its users during business hours, is paramount.

A leading factor in determining which software to use for delivering data/information to end-users should be the ability of the software to produce web-based content that is compatible with WeBOC. Since a majority of the users reside in Customs offices throughout Pakistan, web-accessibility is also important. Furthermore, since FBR is committed to WeBOC as it is centralized, one-stop shop for all Customs related activities, access to the warehouse's front-end components and data should be incorporated into the WeBOC structure in a transparent manner. This can be accomplished by rebranding the data warehouses' web-based content or by embedding links in WeBOC so that the content can be easily understood and navigated by the users.

4.4 End-users

Once the data warehouse has data in a format ready for user consumption, how the end-user will access the information will need to be considered. For the GoP, WeBOC's internet capabilities, and overall user experience, should be leveraged to minimize any learning hurdles that the user may encounter while getting acclimated to the BI interfaces. This can be accomplished by selecting a vendor that has the ability to create analytical modules and reports that are internet-based and easily modifiable to render BI modules as extensions of the existing WeBOC system.

There are many vendors that could be considered in this changing and evolving market place. Hyperion, Cognos, Business Objects, and MicroStrategy are some of the larger companies in the market place and all offer products that are capable of meeting the OLAP needs of the FBR and its user. Microsoft has been in the database and data warehousing market with SQL Server and its SQL Server extension Analysis Server.

Based on costs, ease of use, and SQL Server established as the database and data warehouse platform, it is recommended that Microsoft products be employed for the analytical and reporting services for the end users. It is recommended that Analysis Services be employed at the start and that it be evaluated to determine if the majority, if not all, of the reporting and analytical needs of the end users, and their representative Directorates, can be met. If not, it is recommended that the complimentary yet specialized products such as Power Pivot, Power View, and SharePoint be employed to address gaps in the service offerings.

4.5 Reports and Analysis

Reports exist in the WeBOC system and are available to its user community. There may be a need to replicate aspects of these reports in the data warehouse. The validated, cleansed, and formatted data in the data warehouse would likely supersede the reports that exist in WeBOC, but the real benefit for end users in regards to reporting on the results and information associated with valuation will be the analysis associated with OLAP cubes.

OLAP cubes can be thought of as three-dimensional spreadsheets where the content of the cube contains measures and dimensions created in the data warehouse's data marts. OLAP cubes give users the ability to answer questions they may see in the data by manipulating the presentation of data by digging further into the data (drilling down or drilling up), parsing the information to investigate a new information sect (slicing and dicing), or pivoting the data to see the information from a different perspective.

The OLAP cubes produced will likely become the primary method of analysis and research by users once they become acclimated to cube use and the corresponding data.

5. Data Warehouse Development Methodology

There are two primary design methodologies for data warehouse development: Top-down and bottom-up. Bill Inmon, referred to as the "father of data warehousing" in the data warehousing community, champions the top-down design approach. The top-down approach focuses on an integrated solution that produces an enterprise-wide consolidated view of data and information in a central repository. The top-down approach, compared to bottom-up, is more rigid with regard to the structure of the data warehouse and the data contained therein. The data is rigid and non-volatile in that once it is brought into the data warehouse it is seldom, if ever, manipulated or changed. In addition to the rigidity, another significant drawback is the ability of this method to deliver timely results to new and changing client needs.

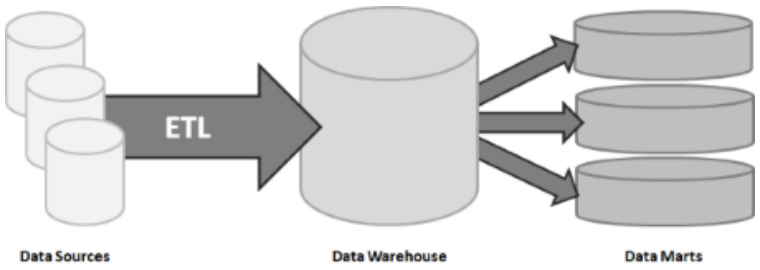


Figure 5: Illustration of Bill Inmon's Top-down Methodology

Ralph Kimball, another stalwart of the data warehousing community, is a proponent of the bottom-up approach, which is also known as dimensional modelling. This approach emphasizes the importance of delivering meaningful and timely information to users as quickly as possible. To do this, the methodology focuses on the creation of data marts to support user and business unit requests. Over time, the number of data marts grow and the value and significance of the data warehouse is realized when the data marts, and their contents, can be united to create the enterprise data warehouse. Returns on investments made with this approach could be realized as soon as the first data mart is created and its contents made available to the users. Overall, this method is more agile and able to deliver quick wins that can be vital for data warehousing support and acceptance. A drawback of this method is that it could be difficult for the enterprise to keep sight of the big picture associated with the entire enterprise when focusing on individual data mart development.

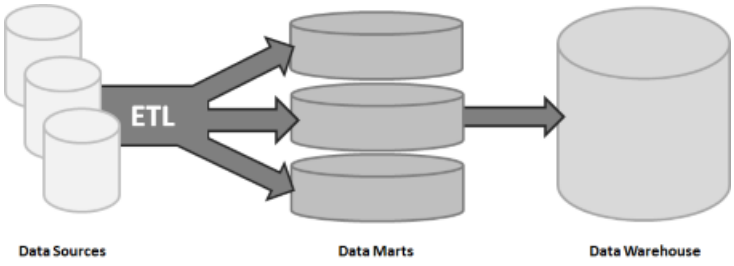


Figure 6: Illustration of Ralph Kimball's Bottom-up Methodology

For FBR, it is recommended that a bottom-up development approach be adopted. The urgency to address existing analytical and reporting needs of Directorates, such as Valuation, is one of the primary reasons for recommending this approach. Another reason is that this approach will allow for a reduction in the time required to deliver meaningful results to Directorates and users, which could have immediate and substantial impact on revenue generation. Furthermore, if results are delivered quickly and the benefits are realized by FBR, then support for the data warehousing effort should increase, resulting in increased gains, both financially and quality of the decision making.

5.1 Data Warehouse Project Management

Data warehouse projects are more complex and wrought with pitfalls as they are usually high profile, adopt too broad an approach to development and deliverables, and often times face unrealistic timelines and expectations. The following suggestions and pieces of advice relating to data warehousing projects and might assist in the management of these projects.

Data Warehouse Project Management Advice

Prashant Pant, a former Deloitte employee who specializes in Business Intelligence, identified suggestions for delivering a success BI initiative in a white paper he authored entitled, *How to Build a Successful BI Strategy.*[1]There are certain proven practices that have been widely accepted in the BI arena and are highly recommended. The following suggestions produced by Prashant Pant can serve as broad guidelines for ensuring the success of the BI initiative:

Steps to ensure success of the BI strategy:

- Create a business case and outline the expected benefits
- Obtain buy in from stakeholders, especially the senior executives
- Have an enterprise-wide perspective
- Establish criteria for success
- Treat information as an asset
- Adopt best practices and standards
- Set up change management procedures
- BI strategy should align with the overall IT strategy and enterprise goals
- Do a current state, future state, and gap analysis
- Think actionable and baby steps
- Establish governance body
- Use iterative implementation approach with parallel tracks
- Work with frameworks and adopt proven methodologies
- Assess BI readiness of the organization and identify related gaps and issues
- Document and analyze the constraints and assumptions
- Consider all BI components

Potential pitfalls to avoid when designing the BI strategy:

- Don't fall into the trap of starting with a narrow vision. BI strategy needs to be holistic and prepared in the context of the wider BI definition.
- Don't plan to use big-bang implementation approach. It has been proven that iterative implementation works better for BI initiatives.
- Always remember that scope of BI is not limited to just selection and implementation of technology. Often mistakes are made by BI architects to associate the BI initiatives to specific technology components, such as implementing parallel processing database technology or building OLAP cubes or dimensional modeling.
- BI iterations should not be done in the haphazard manner. BI strategy document is the necessary roadmap that you should follow as you begin designing BI environment.
- Don't just focus on data integration and state-of-the-art BI tools. BI strategy should be comprehensive and it should incorporate much more than a data warehouse or BI tools.
- During warehouse-centric planning, don't lose sight of the broad vision to ensure the design of a successful enterprise-wide informational asset.
- Don't adopt inflexible approach. BI strategy should be treated as a living artifact and should be constantly tuned and adjusted to reflect the needs of your business.

[1] Pant, Prashant, "How to build a successful BI Strategy" January 10, 2009. Accessed April 2014. http://www.loria.fr/~ssidhom/UE909R/1_BI_strategy.pdf

Project Risk Management

Every project is subject to some risks—risks are unavoidable. Such risks could severely affect the project schedule, as well as the project deliverables, depending on the likelihood that the risks will materialize and on the impact they would have on the project. Therefore, the risk assessment performed during Step 1, Business Case Assessment, must be reviewed and expanded, if necessary. The project manager must identify triggers for each risk and incorporate a mitigation plan, as well as incorporate a contingency plan in the project plan.

Triggers are situations that signal a potential, perhaps imminent materialization of a risk. For example, if management is reviewing the project budget for no apparent reason, this indicates a possible trigger for the risk of losing management support for a BI project.

The mitigation plan specifies what actions the project team can take to prevent the risk from materializing. Continuing with the example above, one could solicit support from the business sponsor and promote the BI initiative to other key executives in the organization to keep the management's interest in the BI project. Should the project run into trouble, the risk of having it cancelled is mitigated or prevented.

The contingency plan specifies alternatives in case the risk does materialize. For example, if management support is lost for the BI project due to a long project schedule, plan to shorten the release cycles by delivering a smaller scope sooner. If management support is lost due to the business sponsor's departure from the organization, it is suggested to have an alternate sponsor ready to become the champion for the BI project.

Some common project risks include the following:

- Lack of management commitment
- Lost sponsor
- Lack of business participation
- Imposed, unrealistic schedule
- Unrealistic scope for the schedule
- Unrealistic expectations
- Unrealistic budget
- Untrained or unavailable staff
- Constantly changing business priorities
- Ineffective project management
- Limited scalability

Many of these risks appear to be present and prevalent at FBR. With the frequent change in leadership and the assumption of new roles and responsibilities, losing a sponsor is a real and common issue at FBR. Lack of management commitment is also an issue, as it appears that Directorates are territorial and often untrusting and unsupportive of projects that are dependent on cooperation and support from other departments. These risks, and the ones already mentioned, are real and should be a concern for project managers on the data warehousing effort. In is imperative to work to mitigate these risks when engaging projects and Directorates requesting business intelligence services.

Roles and Responsibilities

At some point, it will become a Directorate, group, or an individual’s responsibility to ensure the BI solution is created, implemented, and maintained. This will be a fairly significant responsibility as most BI solutions are high profile with many of the requestors, beneficiaries, and users being managers,

directors, and executives of an organization. In addition to pressures to produce for leadership, the solutions are often requested to be completed in an accelerated time period with an expectation of being able to deliver all the data and information-related answers requested immediately. In most BI instances, the work requested and required is too much for any one person to handle alone. It is recommended that several roles be developed to support the BI effort to ensure the success of the BI solution. The following is a list of roles that are commonly found in many BI environments and should be considered for this effort. It is not uncommon for some team members to assume more than one role on the BI team.

Project Manager
BI project managers are needed to ensure that the data warehouse is aligned with the business needs and develop project plans to support the warehouse as it matures. The project manager manages the overall project, performs project reviews, works to accomplish the project tasks identified in the project plan, manages day-to-day activities, generates regular status reports, conducts regular status meetings, manages change control process, coordinates contact with all other vendors, and ensures the project's timely and successful completion.

Technical Architect
This role is responsible for developing and implementing the overall technical architecture of the data warehouse, ranging from the backend hardware/software to the client desktop configurations. This role is usually held by an experienced BI and DW professional. The technical architect should be well versed in all data warehousing technical components and processes from source data identification and extraction to data mart and data warehouse logical and physical designs to designing and creating end user reports and cubes.

Database Administrator (DBA)
This role is responsible for creating the physical database schema, managing the maintenance and performance plans, implementing security, and ensuring the database environment has a high-level of availability for processes and users. Backup, recovery planning, and actual execution are usually a responsibility of this role, in addition to any technical aspects of data loads.

ETL Specialist
This role is responsible for planning, developing, and deploying the extraction, transformation, and loading routine for the data warehouse. Individuals in this role should be detail oriented, with an ability to identify and correct data anomalies, as data validation and processing is integral to the quality of data warehouse's data. The role would further be benefitted by an individual who has experience with the source systems being used by FBR, as any understanding of the source system and its data structure will make data extraction easier and faster.

Reporting and Analytics Specialist
This role is responsible for developing the front-end, whether it is client server or over the web. The person in this role should be experienced in the front-end tools being employed by FBR's user community and also how to develop the reports, cubes, and data sets necessary to meet end-user needs. Since the role will be interacting with end-users for a significant amount of their time, the person in this role should be able to communicate effectively and be able to translate client requirements into data requirements. In addition to these primary roles, other roles are needed to support the BI team. These roles may be permanent roles in the organization, supplements to the BI team, or project specific.

Trainer – This role is responsible for defining and executing a training program to educate end-users on how to use the tools available to the end-user, the structure of the data marts and data repositories, and how to identify and extract information they require. This is a significant role as many

users may not be experienced in the analytical tools and without proper training, end-users will not be able to realize the full benefits of the data warehouse and the data contained within.

Quality Assurance – This role is responsible for ensuring the data in the data warehouse meets data warehouse, project, and organizational data standards. A critical role for the success of the project is ensuring that the data warehouse maintains a high-level of data integrity.

Help Desk – Depending on the size of the project, the number of users, and anticipated and actual inquiries from the user community, there may be a need for a dedicated help desk to handle calls from users. Depending on the volume and complexity of the inquiries, there may be a need to create a tiered support servicing structure that escalates requests through the tiers of support based on the nature of the inquiry or issue and bandwidth of the team.

Subject Matter Experts (SME) – For the duration of the project, and possibly afterwards, there may be a need to identify SMEs in the client business units. These SMEs would be knowledgeable on business unit activities, applications, and data being used as the basis for the data warehouse. They should also be technically savvy and capable users of the data warehousing data, delivering results, and have strong customer service skills.

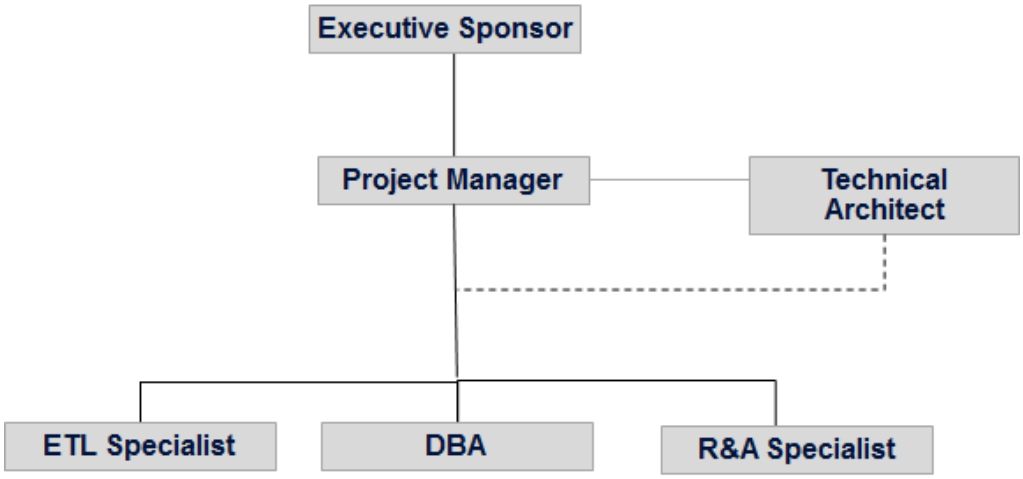


Figure 8: Data Warehouse Team Structure

Depending on the availability of qualified staff, financial commitment, resource commitment from the internal client organization and the BI staff, and the creation and delivery expectations of the client organizations, these roles can be merged and/or expanded to adjust to specific project demands. For example, a skilled Technical Architect should be familiar with all aspects of the data warehouse development process from source data identification to ETL processing to reports and analytical dataset. As a result, if ETL efforts require additional attention, the DBA could assist or take on those responsibilities temporarily or permanently.

Perhaps just as important to the roles listed above, is to have an executive sponsor for the effort. If there is no support from executive leadership, the project may encounter difficulty getting the necessary resources and support from internal client organizations with making requests, proper staffing, or financial support for hardware and software, all requirements for a successful implementation. Executive support is required to make the BI effort a priority in the organization and to ensure the team is given the opportunity and tools to succeed.

Training

Based on conversations with FBR personnel, it was stated that the organization's business intelligence knowledge and skillset was in its infancy. To address the organizational deficiency, it is recommended that four training programs be considered to educate the users and developers of the data warehouse and its products.

Managerial Training Program

It is recommended members of the managerial ranks be provided the opportunity to partake in training that discusses basic data warehousing concepts. The program should discuss the components of the data warehouse from sourcing to end-user products, benefits and costs associated with business intelligence efforts, the impact of a data warehouse initiative on an organization, the impact to an organization that chooses not to pursue a data warehousing initiative, and how an organization can leverage a data warehouse to answer business questions.

Data Warehouse Technical Training

For the staff that will be responsible for designing, developing, and maintaining the data warehouse, training that will address any gaps in the skillset of the team members is recommended. For specialists in the ETL, DBA, and reporting and analytics positions, training specific to those areas should be considered and taken by individuals in the corresponding roles. Senior positions should consider courses that cover all aspects of the data warehouse environment and development life cycle.

End-user Training Program

For the users of the data warehouse and its deliverables, a training should be conducted that provides an understanding of data warehousing concepts and structures, with an emphasis on the user accessible portions of the data warehouse products. In addition, the users should be educated on the structure of information that does exist in the data warehouse and how to disseminate that information to answer questions that need to be addressed. This training may require a technical element, which may include T-SQL for query of the data warehouse and its data marts and how to navigate and extract data from OLAP cubes. This training could be conducted internally or provided by an external trainer.

Application Training Program

The application training program would be a training conducted about applications being utilized, or are going to be utilized, by the data warehouse teams or for warehouse deliverables. This would include the SQL Server database platform currently being utilized by FBR, any ETL tool that may be purchased, and front-end interfaces and tools. The front-end tools would likely require training for both the developers and the users.

These training programs will likely need to be conducted on an ongoing basis to educate new employees, educate users on changes and updates to the data warehouse structure, contents, and strategy, and for any new releases of software that may occur. Over time, training may become less formalized when educational levels and experience of the data warehouse staff and users increase.

6. Future Growth

If the principles and practices described are put into practice then the business intelligence initiative would be capable of handling expansion both in the volume of data in the data warehouse as well as the scope of Directorates and departments, which would be able to be included in the initiative. When developing the data warehouse and its components, consideration must be given to both the current needs and requests but also anticipated future needs of the organization. Associated with future growth and the expansion of the reports, standard practices, and information throughout the organization, the data itself can be leveraged to meet active operational needs, in addition to analytical needs after the active operational activities are completed.

6.1 Data Usage

The data captured in the data warehouse could be used by Directorates other than Valuation and the various Customs Directorates. Information captured could be used for a myriad of investigation processes by organizations such as NTC. The data could also be used to support active customs activities, such as assessing the value of goods being imported, where assessors need to employ World Trade Organization's (WTO) six methods for assessing values.

6.2 The WTO Agreement and the Six Methods

To assess the value of goods being imported into a country, the World Trade Organization's Agreement on Implementation of Article VII of the GATT 1994 established the six-step method for assessing the value of goods. The method's steps are as follows:

- Method 1: Transaction Value
- Method 2: Transaction Value of Identical Goods
- Method 3: Transaction Value of Similar Goods
- Method 4: Deductive Method
- Method 5: Computed Method
- Method 6: Fall-Back Method

The information captured in the data warehouse could be used in these methods in various capacities.

For Method 2, transaction values of identical goods that have been imported into the country could be made available to those who need to utilize this method to assess the value of the goods. Queries could be executed to pull the desired information by product, country of origin, and/or manufacturer to determine if identical goods exist and what the values of those goods are.

For Method 3, transaction values of similar goods could also be derived from the data warehouse. Similar conditions as those identified in Method 2, but with a broader range of goods could be used in the assessment valuation, which would allow for a query to be executed returning values of similar goods.

For Method 4, deductive values could be derived based on the price of the greatest aggregate quantity sold. The data warehouse can provide data for this query as well. During the interview process, many people in Customs stated that the import data that would be collected over time and stored in data warehouse could not be used for this method since the method states import data for only the past 90 days could be used for evaluation purposes.

Although the data warehouse would have import data collected over time that could result in years of data present in the data warehouse, the information can be used for analytical research and investigations as it can monitor trends and fluctuations in market prices. All that will need to be done is to restrict the data to only the last 90 days from the current date in order to make day to day valuation decisions. This can be accomplished by view or a condition captured in the *where* clause of the query

that would be embedded in an interface to be used by the assessors or others performing the investigation.

For Method 5, computed values could also be provided by the data warehouse. This method would normally require an investigation of a manufacturer, costs associated with the manufacturing, and shipping processes. The data warehouse could be built to store the data points associated with these calculations, as well as the results of pervious investigation done by Pakistan, other countries, or third party vendors who have this information available.

For Method 6, the Fall-Back Method can also leverage the data warehouse's data for the assessment of values. The values of the selling prices of goods in the country of importation could be among the data captured and retained in the external market values data mart. The external market values data mart could also be used to provide price of goods for exports to a third country and the price of goods on the domestic market of the country of exportation.

6.3 Compliance with WTO and Other International Standards

In regards to data and data models, the WTO's primary focus is on the establishment of a data model that is compatible with international standards so that data is in a format that is reliable and can be exchanged between countries and other entities. The WTO is focused on the transactional systems, WeBOC in the case of Pakistan and FBR, present in customs environments and not on the analytical systems, e.g. the business intelligence initiative. Therefore, there are no international standards that relate specifically to analytical systems being used by Customs for which they would need to comply.
With that being said, it is recommended that the WTO data model be adopted for the transactional systems to be used by Customs, if it is not already. The standards and best practices identified by WTO will produce a better data set for the data warehouse, and if reports or information produced by the data warehouse are ever selected to replace transaction systems reports, Customs will be in compliance.

7. Conclusion

The Trade Project was only able to obtain a limited amount of information from FBR during the period of this assessment. Therefore it was difficult to adequately assess FBR's business intelligence efforts and quality of the related. FBR did indicate that improvements in the valuations of goods were of paramount importance. However, the Trade Project was not able to obtain access to the current valuation data, reports, or information on ongoing business intelligence efforts.

Multiple challenges to implementing a BI strategy were identified during the research and development of this assessment. These challenges included:

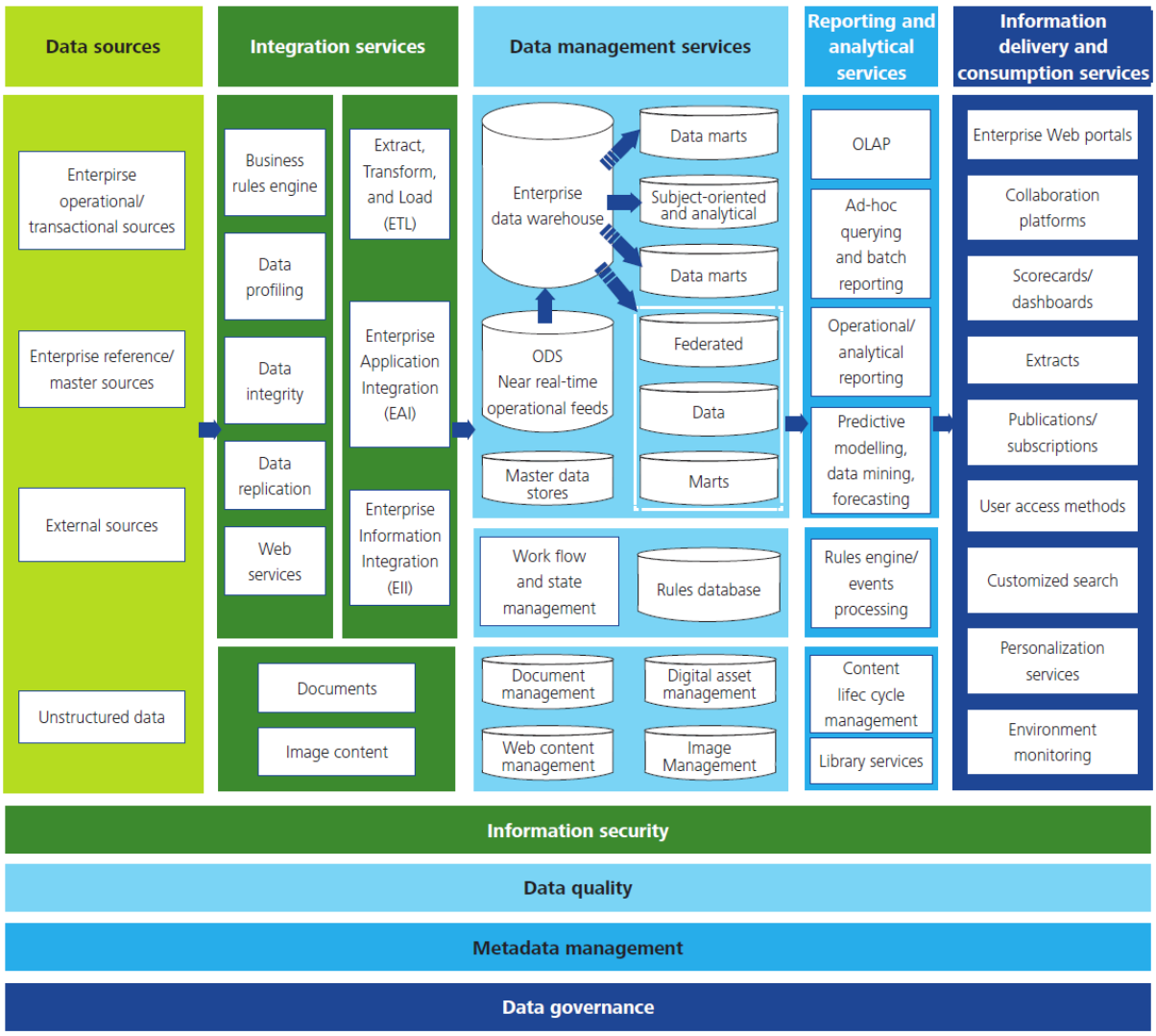
- Frequent changes in FBR leadership
- Lack of business plan continuity
- Inadequate institutional controls and standards
- Lack of dedicated funding
- Directorates operating independently

These institutional challenges will be important considerations to take into account, in addition to the expected challenges of developing an effective data warehouse. Any technical implementation must take place within the organizational context that expects to benefit from the new technology capabilities.

This report provides a starting point for FBR's business intelligence effort. There is tremendous opportunity for FBR to leverage information in meaningful and useful ways to address issues and to improve the operational effectiveness of the organization. By following these suggestions, the FBR can be well-suited to meet the current valuation needs identified for future expansion.

Appendix A – Mature Data Warehouse Architectural Model

Deloitte's Mature Data Warehouse Architectural Model



Appendix B – Valuation Ruling Tables

Table Name	Description	Row Count
Valuation_Mark_Trnslog	Related to the log of gd forward/closed detail level with remarks, mark level and user information	45,869
Valuation_Mark	Related to the log of gd forward/closed detail level with remarks	39,129
Valuation	Data related to sec81 – header	10,272
Valuation_Dtl	Data related to sec81 – detail	99,373
Noting	Noting done by officers in ruling form	58,252
Scn_GD_Inv	Scanned documents	1,098
TblValRuling	Data related to rulings -header	672
TblValRulingDtl	Data related to rulings -detail	13,375
Valuation_Log	Related to the log of gd forward/closed header level	46,640
TblValRulingLog	Log related to rulings	188
TblValRulingOFM	Old rulings issued in Care - header	276
TblValRulingOFDtl	Old rulings issued in Care - detail	287
TblValDesig	Designations in valuation department	22

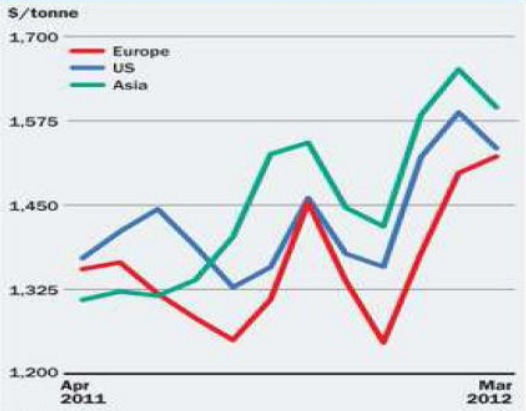
Appendix C – External Valuation Data Sources

The following are the five external valuation data sources as identified by the Valuation Directorate.

1. ICIS Chemical Prices

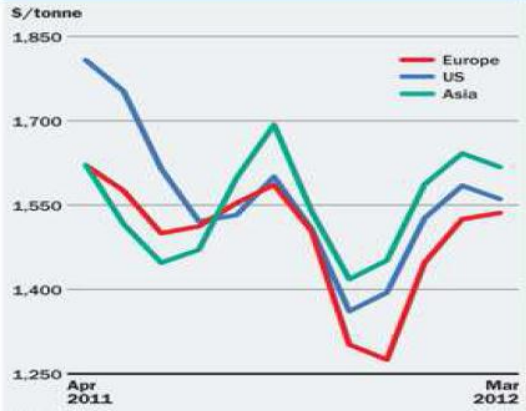
CHEMICAL PRICES

ORTHOXYLENE SPOT PRICES



SOURCE: ICIS

PARAXYLENE SPOT PRICES



SOURCE: ICIS

SPOT BULK CHEMICAL PRICES

	Asia $/tonne	Change	Europe $/tonne	Change	US cents/lb	Change
Naphtha	1,068–1,069 CFR Japan	+1	1,057–1,065 CIF	-13	291.5–292.5/gal DEL	-1
Ethylene	1,380–1,430 CFR NEA	+30	1,550–1,600 CIF	nc	68–76.13 DEL	-3
Propylene[1]	1,500–1,560 CFR NEA	+15	€1,150–1,195 CIF	nc	73.25–73.75	-4.75
Butadiene	3,400–3,450 CFR NEA	-100	3,000–3,100 FOB	-50	150–160 CIF	nc
Benzene	1,175–1,180 FOB Korea	-5	1,170–1,190 CIF	+5	$4.10–4.12/gal FOB HTC	-0.02
Toluene	1,215–1,220 FOB Korea	-2.50	1,240–1,255 FOB	nc	$4.02–4.06/gal FOB	-0.06
Xylene[4]	1,270–1,280 FOB Korea	-55	1,340–1,370 FOB	+10	$4.15–4.22/gal FOB HTC	-0.16
Paraxylene	1,552–1,557 CFR Taiwan	-10	1,525–1,550 FOB	+5	67–69 FOB	-1
Orthoxylene	1,570–1,600 CFR NEA	+12.50	1,630–1,650 FOB	+62.50	68–70 FOB	+0.5
Styrene	1,460–1,470 FOB Korea	+15	1,490–1,525 FOB	+65	66–67 FOB USG	+1
Methanol	382–387 CFR China	+3.50	€300–304 FOB	+6	116–116.5/gal FOB	+1.75
MTBE	1,204–1,222 FOB Singapore	+17	1,435–1,445 FOB	-107	$4.09–4.12/gal FOB USG	-0.31
Ammonia	500–510 CFR Taiwan	+60	475–475 FOB Yuzhny	+25	$473–475/tonne CFR USG	nc
Phenol	1,480–1,530 CFR CMP	-20	€1,240–1,260 FD	nc	65–70 FOB	nc

CONTRACT BULK CHEMICAL PRICES

	Europe, €/tonne	US, cents/lb
Ethylene	1,345 Apr	55.75 Mar
Propylene[1]	1,245 Apr	77.5 Mar
Butadiene	2,275 Apr	152–155 Apr
Benzene	890 Apr	$4.12/gal Apr
Toluene	$1,228–1,238 Apr	-
Xylene	-	$4.24/gal Apr
Paraxylene	1,225 Apr	82 Mar
Orthoxylene	1,130 Mar	71 Apr
Styrene[3]	1,300 Apr	71–75 Mar
Methanol	340 Q2	$1.33–1.34/gal Apr
Ammonia	-	$470/tonne Apr
Ethylene glycol	-	49–50 Apr
Ethanol	77–80/HL	$3.74–3.84/gal Q1

Prices contained in this magazine are gathered by ICIS pricing through consultation with producers, consumers and traders across Asia, Europe and the US. They are intended as a guide to price levels of recent transactions and reflect medium-to-large tonnage sales. *ICIS Chemical Business* and ICIS pricing accept no liability for commercial decisions that are based on the market information/prices reported in this magazine.

Abbreviations used are FOB (free on board), CIF (cost, insurance and freight), FCA (free carrier), CFR (cost and freight), DEL (delivered). European contract prices are quoted on a free-delivered basis (FD), unless otherwise stated. na = not applicable, nc = no change. 1 = polymer grade, 2 = solvent grade, 3 = barge price, 4 = isomer grade.

Spot prices in this issue are based on information that was available on April 13, 2012. Dollar prices are also based on rates of exchange on April 13, 2012. $1 = €0.758; $1 = £0.626; €1 = £0.826

2. Metal Bulletin – Sample below represents a single page from the eight-page monthly bulletin.

Daily metal and steel

London forward

"LME settlement prices. All prices per tonne, unless otherwise stated, in LME warehouse, EU duty, if any paid, for buyers account."

Year ago Aug 1			*Jul 26*	*Jul 29*	*Jul 30*	*Jul 31*	*Aug 1*
Aluminium High Grade $							
1843.50-**1844.00**	LME Cash	official	1761.00-**1761.50**	1759.50-**1760.00**	1741.00-**1741.50**	1731.50-**1732.00**	1776.00-**1776.50**
		"unofficial"	1753.00-1754.00	1751.00-1752.00	1731.00-1732.00	1736.00-1737.00	1780.50-1781.50
1877.00-1877.50	LME 3 months	official	1805.00-1805.50	1802.00-1803.00	1786.00-1787.00	1777.50-1778.00	1821.50-1822.00
		"unofficial"	1797.00-1798.00	1797.00-1798.00	1778.00-1779.00	1783.00-1784.00	1826.00-1827.00
	LME Tapo Notional Average Price(NAP) for Aug 2013		1771.10	1770.57	1769.25	n/a	1776.50
	LME stocks (tonnes)		5,476,175	5,473,925	5,478,525	5,471,100	5,472,375
Aluminium Alloy (A380.1/DIN226/D12S) $							
1755.00-**1759.00**	LME Cash	official	1760.00-**1770.00**	1745.00-**1746.00**	1774.00-**1775.00**	1755.00-**1765.00**	1770.00-**1780.00**
		"unofficial"	1761.00-1771.00	1755.00-1765.00	1770.00-1775.00	1755.00-1765.00	1771.00-1781.00
1770.00-1780.00	LME 3 months	official	1790.00-1800.00	1775.00-1780.00	1800.00-1805.00	1795.00-1800.00	1805.00-1815.00
		"unofficial"	1790.00-1800.00	1785.00-1795.00	1880.00-1805.00	1790.00-1800.00	1805.00-1815.00
	LME stocks (tonnes)		66,960	66,960	66,960	66,960	66,960
N. American Special Aluminium Alloy							
1825.00-**1825.50**	LME Cash	official	1850.00-**1850.50**	1831.00-**1831.50**	1825.00-**1825.50**	1805.00-**1806.00**	1820.00-**1821.00**
		"unofficial"	1855.00-1865.00	1842.00-1852.00	1827.00-1832.00	1805.00-1815.00	1816.00-1826.00
1870.00-1880.00	LME 3 months	official	1870.00-1880.00	1840.00-1850.00	1845.00-1850.00	1825.00-1835.00	1840.00-1841.00
		"unofficial"	1870.00-1880.00	1860.00-1870.00	1845.00-1850.00	1825.00-1835.00	1835.00-1845.00
	LME Stocks (tonnes)		115,100	115,300	115,280	115,260	115,380
Copper Grade A$							
7495.00-**7500.00**	LME Cash	official	6905.00-**6905.50**	6860.00-**6860.50**	6751.00-**6752.00**	6800.00-**6805.00**	6998.00-**6999.00**
		"unofficial"	6823.00-6825.00	6865.50-6867.50	6730.00-6732.00	6791.50-6796.50	7024.00-7029.00
7500.00-7505.00	LME 3 months	official	6924.50-6925.00	6882.00-6883.00	6770.00-6775.00	6809.00-6810.00	7005.00-7010.00
		"unofficial"	6838.00-6840.00	6879.00-6881.00	6741.00-6743.00	6800.00-6805.00	7030.00-7035.00
	LME Tapo Notional Average Price(NAP) for Aug 2013		6906.05	6903.88	6896.98	n/a	6999.00
	LME stocks (tonnes)		618,775	613,550	612,800	610,725	608,675
Lead $							
1886.00-**1886.50**	LME Cash	official	2060.00-**2060.50**	2054.00-**2056.00**	2028.50-**2029.00**	2033.00-**2033.50**	2088.00-**2090.00**
		"unofficial"	2054.00-2057.00	2046.00-2047.00	2024.00-2025.00	2030.50-2032.50	2104.50-2109.50
1899.50-1900.00	LME 3 months	official	2065.00-2066.00	2059.50-2060.00	2036.50-2037.00	2043.50-2044.00	2114.00-2115.00
		"unofficial"	2060.00-2063.00	2054.00-2055.00	2035.00-2036.00	2043.00-2045.00	2115.00-2120.00
	LME stocks (tonnes)		198,350	200,225	200,225	200,225	200,125
Nickel$							
15705-**15710**	LME Cash	official	13825-**13830**	13635-**13640**	13430-**13435**	13565-**13570**	13750-**13765**
		"unofficial"	13770-13790	13625-13650	13475-13525	13650-13675	13880-13890
15795-15800	LME 3 months	official	13900-13905	13715-13725	13490-13500	13645-13650	13850-13860
		"unofficial"	13840-13860	13700-13725	13550-13600	13725-13750	13950-13960
	LME stocks (tonnes)		200,280	200,790	203,028	204,330	204,336
Tin $							
17900.00-**17950.00**	LME Cash	official	19310.00-**19315.00**	19365.00-**19395.00**	19740.00-**19760.00**	19885.00-**19895.00**	20550.00-**20555.00**
		"unofficial"	19240.00-19265.00	19515.00-19565.00	19750.00-19775.00	19915.00-19940.00	20855.00-20905.00
17950.00-17955.00	LME 3 months	official	19275.00-19300.00	19400.00-19425.00	19745.00-19750.00	19900.00-19905.00	20555.00-20560.00
		"unofficial"	19275.00-19300.00	19550.00-19600.00	19775.00-19800.00	19925.00-19950.00	20850.00-20900.00
	LME stocks (tonnes)		14,545	14,000	13,845	13,845	13,910
Zinc Special High Grade $							
1816.00-**1816.50**	LME Cash	official	1832.00-**1832.50**	1809.00-**1809.50**	1800.00-**1801.00**	1792.50-**1793.00**	1822.00-**1822.50**
		"unofficial"	1826.00-1828.00	1807.00-1809.00	1797.00-1799.00	1797.00-1799.00	1835.00-1837.00
1827.00-1827.50	LME 3 months	official	1866.00-1866.50	1845.50-1846.00	1836.00-1838.00	1834.50-1835.00	1861.00-1861.50
		"unofficial"	1860.00-1862.00	1843.00-1845.00	1835.00-1837.00	1836.00-1838.00	1873.00-1875.00
	LME stocks (tonnes)		1,055,125	1,053,575	1,049,475	1,005,400	1,041,400
Cobalt min 99.3%							
30000.00-**31000.00**	LME Cash	official	27250.00-**27500.00**	27000.00-**28000.00**	26250.00-**26300.00**	25550.00-**25555.00**	25320.00-**26320.00**
	LME 3 months	official	27600.00-27700.00	27100.00-28100.00	26500.00-27000.00	25750.00-26550.00	25500.00-26500.00
	LME stocks (tonnes)		479	482	482	482	482
Molybdenum $							
25000.00-**26000.00**	LME Cash	official	19300.00-**20300.00**	19300.00-**20300.00**	19600.00-**20600.00**	19600.00-**20600.00**	19600.00-**20600.00**
25000.00-26000.00	LME 3 months	official	19300.00-20300.00	19300.00-20300.00	19600.00-20600.00	19600.00-20600.00	19600.00-20600.00
	LME stocks (tonnes)		216	216	216	216	216
Steel Billet							
375.00-**385.00**	LME Cash	Official	125.00-**135.00**	125.00-**135.00**	125.00-**135.00**	125.00-**135.00**	125.00-**135.00**
		"unofficial"	125.00-135.00	125.00-135.00	125.50-135.50	126.00-136.00	127.50-137.50
395.00-405.00	LME 3 months	official	155.00-165.00	155.00-165.00	155.00-165.00	155.00-165.00	155.00-165.00
		"unofficial"	155.00-165.00	155.00-165.00	155.00-165.00	155.00-165.00	155.00-165.00
	LME stocks (tonnes)		56,160	54,145	52,130	50,115	48,035
Gold $/troy oz							
1614.75	London	morning	1327.75	1330.75	1322.25	1331.50	1323.75
1599.00	London	afternoon	1331.00	1329.75	1324.15	1314.50	1315.00
1599.00	Handy/Harman		1331.00	1329.75	1324.15	1314.50	1315.00
Silver per troy oz							
1783.11/2787.00	London Spot	pence/cents	1299.16/2002.00	1306.38/2010.00	1285.01/1968.00	1312.01/1994.00	1295.24/1972.00
2731.00	Handy/Harman	cents	1971.50	1995.00	1973.50	1947.00	1966.00
Palladium $/troy oz							
589.00	London	morning	741.00	724.00	737.00	737.00	728.00
586.00	London	afternoon	731.00	731.00	738.00	733.00	733.00
Platinum $/troy oz							
1412.00	London	morning	1438.00	1428.00	1436.00	1442.00	1436.00
1394.00	London	afternoon	1428.00	1436.00	1439.00	1433.00	1437.00

Kuala Lumpur tin market

Year ago Aug 1	*Jul 26*	*Jul 29*	*Jul 30*	*Jul 31*	*Aug 1*
Tin $/tonne					
18,000	19,400	19,400	19,700	19,870	20,450

Dubai

Please note this price is no longer quoted

Rebar $

3. Platts Polymerscan – Page 1 of 3 of weekly oil and oil products schedule.

platts
www.platts.com
Polymerscan
Volume 34 / Issue 27 / July 6, 2011

Americas Polymer Spot Price Assessments

	FAS Houston ($/mt)	US Contract dlvd railcar (cts/lb)	US Domestic ($/mt)	FOT Brazil* ($/mt)	CFR Brazil ($/mt)	CFR PERU ($/mt)
PVC SUSP	980-1000	49.00-49.50	1079.96 -1090.98	—	1090-1110	1030-1050
LDPE G-P	1433-1455	91.00-92.00	2005.64 -2027.68	1820-1830	1700-1720	1680-1690
LLDPE (Butene)	1290-1323	71.00-72.00	1564.84 -1586.88	1450-1460	1410-1420	1400-1410
HDPE Inj	1301-1323	73.00-75.00	1608.92 -1653.00	1540-1550	1500-1510	1480-1490
Bmldg	1257-1279	73.00-74.00	1608.92 -1630.96	1530-1540	1490-1500	1380-1390
Film	1290-1312	75.00-76.00	1653.00 -1675.04	1540-1550	1490-1500	1430-1440
Yarn	—	—	—			1354-1356
PP Homo Inj	1697-1719	91.00-92.00	2005.64 -2027.68	1690-1700	1670-1680	1660-1670
Fiber	—	92.00-93.00	2027.68 -2049.72	—	—	—
Copol	1720-1742	—		1720-1730	1700-1710	1690-1700
IPP Film						
BOPP						
PS G-P	1685-1695	89.00-91.00	1961.56 -2005.64	—		
HIPS	1910-1920	100.00-102.00	2204.00 -2248.08	—		
ABS Inj	—	128.00-130.00	2821.12 -2865.20	—		
PET bottle grade	1764-1786#	1962-1984##				

Notes: All price assessments reflect spot trades with the exception of US Contract Delivered railcar. * FOT Brazil assessments are for export material via truck to MERCOSUR markets. # US PET bottle grade refers to DDP US West Coast. ## US PET contract price is in $/mt.

Asian Polymer Spot Price Assessments

	CFR FE Asia ($/mt)	CFR SE Asia ($/mt)	CFR South Asia ($/mt)	China Domestic (Yuan/mt)
PVC SUSP	1105-1107	1105-1107	1100-1102	^8250-8300
				^^7800-7850
LDPE G-P	1459-1461	1469-1471	—	12280-12320
LLDPE (Butene)	1269-1271	1274-1276	1299-1301	10480-10520
HDPE Inj	1349-1351	1344-1346	1289-1291	—
Bmldg	1349-1351	1344-1346	1289-1291	—
Film	1349-1351	1344-1346	1299-1301	11080-11120
Yarn	1359-1361	—	—	
PP Homo Inj/Raffia	1474-1476	1474-1476	1489-1491	11780-11820
Fiber	—	—		
Copol	1464-1466	1484-1486	1509-1511	—
IPP Film	1484-1486	1484-1486	1499-1501	—
BOPP	1484-1486	1484-1486	1499-1501	—
PS G-P	1509-1511	1539-1541	—	—
HIPS	1739-1741	1754-1756	—	—
ABS Inj	2094-2096	2119-2121	—	—
PET bottle grade	1574-1576 **	1584-1586 **	—	—

Notes: Asian PVC, PS, and ABS, FE Asia refers to China. All Asian polymer assessments are basis L/C 0-30 days Credit differentials calculated using 1 month LIBOR +1.5%. ** Asian PET prices denote FOB North East Asia (South Korea, China) and FOB Southeast Asia (Thailand, Indonesia) respectively. ^ PVC China domestic price refers to ethylene-based production and ^^ PVC China domestic price refers to carbide-based production.

Contents

The McGraw Hill Companies

4. The Public Ledger Market Prices – Page 1 of 5 of weekly schedule for a variety of goods and products.

Market Prices

Prices from the world's leading futures and physical markets

These prices are updated every working day:
Go to **www.public-ledger.com/dailyprices**
Plot, analyse and download prices from our database back more than a decade:
Go to **www.public-ledger.com/pricegraphs**

GRAINS

WHEAT

FUTURES

▲ Liffe grade B (£/mt)

	This Week	Last Week	2011 High	2011 Low
May 11	205.75	203.00	212.75	170.00
Jul 11	205.75	204.00	215.00	172.90
Nov 11	170.50	165.50	181.00	145.00
Jan 12	174.05	171.50	174.20	157.75
Total volume:	1211	472	1854	331

▲ CBOT (¢/60lb bu) (opening prices)

May 11	782.50	751.25	917.00	667.75
Jul 11	818.25	787.25	943.25	705.50
Sep 11	854.25	825.00	968.75	741.00
Dec 11	885.50	850.75	895.50	768.75

▲ Kansas (¢/bu) (opening prices)

May 11	942.50	887.00	999.25	780.25
Jul 11	953.00	897.50	1008.00	791.25
Sep 11	965.50	911.25	1020.00	806.50
Dec 11	979.50	928.50	989.00	825.75

▲ Minneapolis (¢/bu) (opening prices)

May 11	957.25	911.50	1041.75	809.50
Jul 11	965.50	919.00	1048.25	818.50
Sep 11	938.25	921.75	1046.50	822.25
Dec 11	977.50	933.25	986.00	831.50

▲ Liffe milling wheat (€/mt)

May 11	250.25	240.50	275.50	203.00
Aug 11	219.25	206.25	244.50	171.50
Nov 11	218.75	210.00	246.00	187.75
Jan 12	217.75	210.50	219.75	187.25

PHYSICALS

Canada export in store basis St. Lawrence No. 1 (C$/mt)

No. 1 CW				
▲ 13.5% protein	443.80	416.25	488.95	394.20

▲ Hard Amber Durum Wheat US origin in-store Atlantic Coast (C$/mt)

Spot	456.78	426.40	500.31	404.35

✦ English feed (export) fob UK (£/mt)

May 11	201.00	201.00	203.40	187.25
Nov 11	164.00	164.00	205.00	164.00

PRODUCTS

✦ flaked	146.00	146.00	146.00	146.00

CORN/MAIZE

FUTURES

▲ CBOT (¢/56lb bu) (opening prices)

May 11	761.25	693.25	769.25	608.00
Jul 11	768.75	701.00	777.00	612.25
Sep 11	701.50	655.25	707.75	556.75
Dec 11	646.50	625.25	647.25	560.00

PHYSICALS

✦ US No.3 Yellow/ transhipped E.Coast (£/mt)

	161.50	161.50	161.50	161.50

PRODUCTS

Bulk ex-works flaked

✦ Flaked (£/20kg sacks)				
Apr 11	208.00	208.00	209.00	208.00
✦ Bulk ex-works large/kibbled				
Apr 11	188.00	188.00	189.00	188.00

FUTURES

▲ TGE Corn Futures (¥/mt)

May 11	30820	28690	30820	23850
Jul 11	31730	28500	31730	23590
Sep 11	30500	27500	30500	23500
Nov 11	28180	25910	28180	22410

BARLEY

▲ ICE Futures Canada (C$/mt) (opening prices)

May 11	200.00	200.00	205.00	190.00
Jul 11	205.00	205.00	205.00	194.00
Oct 11	205.00	195.00	205.00	180.00
Dec 11	205.00	200.00	205.00	190.00

PRODUCTS

✦ Bulk ex-works flaked				
Apr 11	136.00	136.00	136.00	136.00

OATS

FUTURES

▲ CBOT Oat Futures ($/mt)

Apr 11	267.30	249.90	291.80	212.70

PRODUCTS

Bulk ex-works rolled/flaked

✦ Rolled	136.00	136.00	136.00	136.00

RICE

PHYSICALS

✦ Thai long grain white 100% B grade fob, Bangkok ($/mt)	480	480	550	480
✦ Pakistan Basmati super fob Karachi ($/mt)	1200	1200	1200	1200
✦ Pakistan Basmati ordinary fob Karachi ($/mt)	1150	1150	1150	1150
▲ Vietnam 5% broken fob Saigon ($/mt)	470/490	455/490	495/540	440/445
✦ US domestic Texas long grain ($/mt)	512/591	512/591		

SEEDS AND PULSES

MILLET

✦ N. American No.1 99.9% purity, ex-store UK (£/mt) EU Levy paid	460	460	460	460
North American No.1 cif UK (excl.EU levy) ($/mt)	unq	unq	unq	unq

LENTILS

✦ Turkish red split 0+0 fob Mersin ($/mt)	1050	1050	1050	1050
✦ Turkish Red whole fob (Mersin/Turkey) ($/mt)	850	850	850	850
✦ Red Whole fob Australian ports ($/mt)	700	700	750	700
✦ Red whole fob Canada ($/mt)	700	700	750	700
✦ Green fob Canada ($/mt)	950	950	950	800

BEANS

✦ US No.1 haricot beans, ex-store UK (£/mt)	500	500	500	500
✦ US No.1 haricot beans, cif UK ($/mt)	650	650	650	650
✦ Dark red kidney UK recleaned polished, ex-store UK (£/mt)	630	630	630	630
✦ Dark red kidney beans, No.1 grade cif UK ($/mt)	800	800	800	800
✦ Black Eye beans No.1, ex-store UK (£/mt)	650	650	650	650
✦ Black Eye beans, cif UK ($/mt)	900	900	900	900
✦ Butter beans, Californian No.1, ex-store UK (£/mt)	710	710	710	710
✦ Butter beans Californian No.1, cif UK ($/mt)	1000	1000	1000	1000

CHICKPEAS

✦ Turkish 1%, recleaned, ex-store UK (£/mt)	601	601	601	601
✦ Turkish 1%, cif UK ($/mt)	940	940	940	850

OILSEEDS, OILS AND FATS

SOYABEANS

FUTURES

▼ CBOT (¢/60lb bu) (opening prices)

May 11	1384.75	1407.00	1463.00	1299.50
Jul 11	1396.25	1417.75	1469.25	1296.25
Aug 11	1397.00	1414.50	1447.75	1279.50
Sep 11	1391.25	1400.50	1404.25	1287.50

PHYSICALS

▲ US No.2 Yellow Gulf ports cif Rotterdam ($/mt)				
Oct 11	562.30	561.10	588.70	531.30
▼ Brazil cif Rotterdam ($/mt)				
Jun 11	550.30	551.90	586.30	531.50
▲ Argentina cif Rotterdam ($/mt)				
Apr 11	520.60	519.70	555.80	490.10

FUTURES

▲ TGE Non-GMO Soyabean Futures (¥/mt)

Apr 11	48510	48510	49830	46900
Jun 11	51200	52000	52890	47360
Aug 11	57600	57590	58400	48380
Oct 11	58000	57200	58000	50580

SOYA OIL

▲ CBOT (¢/lb) (opening prices)

May 11	59.16	58.82	60.13	53.15
Jul 11	59.76	59.39	60.58	53.74
Aug 11	59.96	59.55	60.69	53.93
Sep 11	60.02	59.90	60.13	54.02

PHYSICALS

▲ Crude Dutch ex-mill fob (€/mt)				
Apr 11	926.00	925.00	1058.00	885.00
May 11/Jul 11	931.00	931.00	1035.00	888.00
▲ Refined, bleached & deodorised ex-tank Rotterdam (£/mt)				
Apr 11	878	866	959	834
May 11	878	877	946	842
Jun 11	878	892	918	842
Jul 11	901	unq	909	898
▲ US export fob Gulf crude (previous day's prices) ($/mt)				
May 11	1314	1299	1363	1200
Jul 11	1327	1303	1331	1204
Aug 11	1331	unq	1335	1331
▲ US, crude rail basis Central Illinois (c/lb) (previous day's prices)	57.53	55.82	57.53	51.24
✦ fob Argentina compared to CBOT, sellers $/mt				
Jan 11	+ 70	+ 70	+ 70	+ 70
Feb 11	+ 80	+ 80	+ 80	+ 80
Mar 11	+ 90	+ 90	+ 90	+ 90
✦ Fob Argentina compared to CBOT, buyers $/mt				
Jan 11	+ 25	+ 25	+ 25	+ 25
Feb 11	+ 40	+ 40	+ 40	+ 40
Mar 11	+ 30	+ 30	+ 30	+ 30

RAPESEED/CANOLA

FUTURES

▼ ICE Futures Canada (C$/mt) (opening prices)

May 11	591.50	596.10	626.10	430.75
Jul 11	599.80	604.70	633.10	432.00
Nov 11	578.50	581.60	605.00	436.50
Jan 12	584.50	589.80	590.80	519.20

✦ Liffe rapeseed (€/mt)

May 11	474.00	486.25	497.00	412.50
Aug 11	439.25	439.50	457.75	387.00
Nov 11	440.50	439.75	460.50	389.00
Feb 12	444.00	443.00	462.25	391.25
Volume:	10	28	4692	8

PHYSICALS

▲ UK rapeseed, delivered Erith (£/mt) (buyer)				
Apr 11	418	410	418	375
▲ UK rapeseed, delivered Erith (£/mt) (seller)				
Apr 11	420	412	420	377

RAPESEED OIL

▲ Crude Dutch/EU, fob mill (€/mt)				
May 11/Jul 11	1015.00	1010.00	1120.00	960.00
Aug 11/Oct 11	970.00	960.00	1100.00	900.00
▲ Crude fob Rotterdam ($/mt)	1620	1585	1650	761
▲ Refined, ex-works UK (£/mt)	1073	1066	1167	836
▲ Hardened, ex-works UK (£/mt)	1163	1156	1287	926
▲ Refined, bleached & deodorised ex-tank UK, broker price (£/mt)				
Apr 11	996	979	1048	925
May 11	996	976	1018	925
Jun 11	996	976	1018	925
Jul 11	996	unq	1005	995

SUNFLOWERSEED OIL

▲ Crude EU origin ex-tank cif Rotterdam				
May 11/Jun 11	1410.00	1355.00	1500.00	1340.00
▲ Crude, fob Rotterdam ex-refinery ($/mt)	1635	1595	1725	872
▲ Refined, ex-works UK (£/mt)	1101	1090	1174	972
▲ Hardened, ex-works UK (£/mt)	1222	1210	1295	1092
▲ Refined, bleached & deodorised ex-tank Rotterdam (£/mt)				
Apr 11	1051	1033	1150	1009
May 11	1051	1033	1109	1009
Jun 11	1051	1033	1070	1009
Jul 11	1058	unq	1058	1051
US export fob Gulf crude ($/mt) (previous day's prices)				
May 11	unq	1607	1672	1509
Jul 11	unq	1612	1612	1513
Aug 11	unq	unq	1644	1644

SUNFLOWERSEED

✦ US hulled cif UK ($/mt)	1470	1470	1600	1470
✦ Ukraine unhulled Black Sea Origin ($/mt)				
Apr 11	615.00	615.00	680.00	455.00
✦ US hulled ex-store UK (£/mt)	940	940	940	940

5. Pakistan Tea Association – Page 1 of 11 of tea schedule.

'AKISTAN TEA ASSOCIATION Page 1

SINESS PLAZA MUMTAZ HASSAN ROAD OFF I. I. CHUNDRIGER ROAD KARACHI.
TEL NO. 242-2161, FAX NO. 242-2209, E. MAIL. pta@cyber.net.pk

ORIGIN **KENYA**

FIXED PRICES SYSTEM (FPS) FOR TEA 01-03-2013 TO 31-03-2013

AUCTION NO. 05 DT.29-01-2013
AUCTION NO. 06 DT.04-02-2013
AUCTION NO. 07 DT.11-02-2013
AUCTION NO. 08 DT.19-02-2013
AUCTION NO. 09 DT.26-02-2013

	GARDEN	BP1	PF1	PD	D1
1	ARROKET	266	274	286	299
2	BONDET	278	281	298	
3	CHANGOI				
4	CHEBOSWA				
5	CHEBUT	320	316	303	296
6	CHIM CHIM	282	246	276	284
7	CHEMAMUL	276	286	306	
8	CHEMOMI	336	296	300	304
9	CHINGA	376	348	341	316
10	EBEREGE	291	319	310	302
11	GACHARAGE	396	331	339	341
12	GACHEGE	351	316	321	305
13	GATHUTHI	386	350	351	366
14	GATUNGURU	374	331	336	326
15	GIANCHORE	316	322	322	316
16	GITHAMBO	376	334	342	348
17	GITHONGO	396	334	340	341
18	GITUGI	396	336	346	346
19	IGEMBE	376	332	336	316
20	IKUMBI	366	326	342	334
21	IMENTI	406	340	348	364
22	IRIANI	372	322	331	314
23	ITUMBE	334	328	318	311
24	JAMJI				
25	KAGWE	364	321	342	314
26	KAIMOSI				
27	KAISUGU		286	293	

ABOVE PRICES ARE IN US$ DOLLAR CENT PER KG C&F KARACHI